CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

1.1.1 Skid Resistance

Skid resistance can be understand as the frictional between tire and roads pavements. If road pavements has no skid resistance effect, the vehicles on road tend to be skidded which can cause crash.

There were many factors to influence skidding such as pavement surface type, aggregate type, pavement surface conditions, vehicles speed and driver ability. And these factors can be categorized into three categories which were tired-related factors (the composition of rubber tire, the life span of tire and the pressure of tire); pavement-related factors (pavement surface characteristics, microtexture and macrotexture); and intervening-substance-related factors (substances retain on road pavements surface and oil contaminants) (Shafii 2009).

1.1.2 Pavement Surface Characteristics

There were 4 levels of pavement texture as defined by World Road Association (PIARC) and Henry (2000) which are roughness, megatexture, macrotexture and microtexture. The wavelength of roughness was the biggest among others type of pavement surface whereas mircotexture was the smallest wavelength. The wavelength definition for each types of pavement surface characteristics were summarized as shown in Table 1.1.

Table 1.1: PIARC Texture Definitions

Texture level	Wavelengths
Microtexture	$\lambda < 0.5$ mm
Macrotexture	0.5 mm $< \lambda <$ 50 mm
Megatexture	50 mm $< \lambda <$ 0.5 m
Roughness	0.5 m $< \lambda <$ 50 m

Adapted from: Kuttesch *et al.* (2004)

Among these texture levels, 2 elements that received great interest in skid resistance were macrotexture and microtexture. Macrotexture characteristics can be interpreted as road having rough surface, while no macrotexture characteristics was referred to pavement with a smooth surface. Pavement having harsh surface can be interpreted as pavement having microtexture characteristics. Whereas pavement having polished surface can be understood as having no microtexture characteristics. With these 2 elements, pavement surface condition can be divided into four division: smooth and polished surface, smooth and harsh surface, rough and polished surface, rough and harsh surface (Kokkalis & Panagouli 1998).

In addition, microtexture played more important role when compared to macrotexture has been studied (Kokkalis & Panagouli 1998). However, macrotexture will influence more than microtexture in the pavement with wet condition and vehicles with high speed (Kokkalis & Panagouli 1998).

1.1.3 Macrotexture

Most of the research in macrotexture was discussing about the texture depth of pavement and its effectiveness to drain water out from pavement. The macrotexture having wavelength characteristics of 0.5 mm – 50 mm and amplitude characteristics with value of 0.1 mm – 20 mm (Ahammed & Tighe 2012). The difference between microtexture and macrotexture as shown in Figure 1.1.

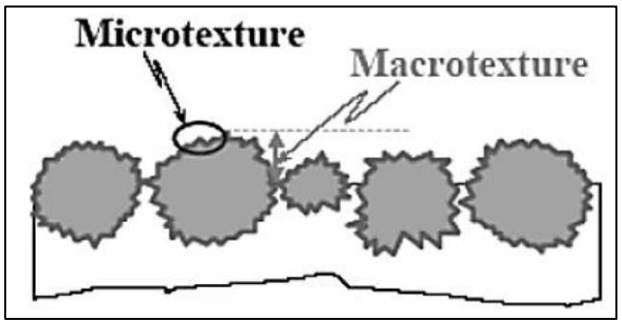

Figure 1.1: Difference between microtexture and macrotexture

Source: Baskara *et al.* (2016)

Georgiou & Loizos (2014) studied that macrotexture played a skid resistance performance role when vehicles speed was high. This finding has spark the interest towards this research where mean texture depth (MTD) has been selected as the macrotexture parameter to be investigated.

1.1.4 Chip Seal

Chip seal is located at the top surface of pavement. Chip seal is a combination of a layer of bituminous binder and a layer of aggregate. The effectiveness of the aggregate binder bond contributed mostly to the performance of chip seal (Aktaş, Karaşahin, Saltan, *et al.* 2013). Moreover, the surface of aggregate free of impurities showed a good skid resistance performance (Aktaş, Karaşahin, Saltan, *et al.* 2013). In order to have good achievement of chip seal, the limit for initial texture depth should not be less than 9 mm (Gürer *et al.* 2012).

1.2 PROBLEM STATEMENT

The issue of road accident have been a headline and reported by media. According statistics from Malaysian Institute of Road Safety Research (MIROS), there was a steady increase in the number of road crashes every year from year 1997 to 2015. In year 2014, the number of road crashes recorded at 476,196 crashes and increased to 489,606 crashes in year 2015. There was an increase of about 2.8% in a year.